CLINICAL AND LABORATORY PROFILE AND ASSESSMENT OF HEALTH AND FUNCTIONAL STATUS OF CHILDREN OF < 12 YEARS WITH JUVENILE IDIOPATHIC ARTHRITIS

Dissertation submitted for

M.D DEGREE EXAMINATION

BRANCH VII - PAEDIATRIC MEDICINE

MARCH 2010

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

CHENNAI

CERTIFICATE

This is to certify that the dissertation titled ***"clinical and laboratory profile and assessment of health and functional status of children of < 12 years with juvenile idiopathic arthritis****" submitted by* ***DR. N.KISHORE*** *to the faculty of paediatrics, the tamilnadu dr. m.g.r. medical university, chennai in partial fulfillment of the requirement for the award of* ***M.D. DEGREE (PAEDIATRICS)*** *is a bonafide research work carried out by his under our direct supervision and guidance.*

Dr.J.MOHANASUNDARAM,
M.D., Ph.D., DNB,
Dean,
Madras Medical College,
Chennai - 3.

Dr.SARADHA SURESH,
M.D., Ph.D.,F.R.C.P(Glascow)
Director & Superintendent,
Institute of Child Health and
Hospital for Children,
Egmore, Chennai - 8.

DR. P.S.MURALIDHARAN MD.,DCH
Additional Professor of Paediatrics,
Institute of Child Health and Hospital for Children,
Egmore, Chennai-8

DECLARATION

I. **DR.N. KISHORE** solemnly declare that the dissertation titled **"CLINICAL AND LABORATORY PROFILE AND ASSESSMENT OF HEALTH AND FUNCTIONAL STATUS IN CHILDREN < 12 YEARS WITH JUVENILE IDIOPATHIC ARTHTRITIS"** has been prepared by me.This is submitted to **The Tamilnadu Dr. M.G.R. Medical University**, Chennai in partial fulfillment of the rules and regulations for the M.D. Degree Examination in Pediatrics.

Place : Chennai
Date :

Dr.N. KISHORE

SPECIAL ACKNOWLEDGEMENT

My sincere thanks to **Prof.Dr.Mohana sundaram M.D.,** the Dean, Madras medical college, for allowing me to do this dissertation and utilize the institutional facilities.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to **Prof. Dr. S. Saratha Suresh, M.D., Ph.D FRCP** (Glasgow) Director and superintendent of Institute of child health and hospital for children for permitting me to undertake this study and for her guidance, invaluable help, encouragement and support throughout the study.

I am extremely thankful to **Prof.Dr. P.S. MURALIDHARAN MD DCH,** Additional Professor of paediatrics and my unit chief for his guidance invaluable and timely help, encouragement and support throughout the study.

I express my sincere thanks to my guide **PROF. DR. M. PORKODI MD., DM,** Professor of Rheumatology, Madras Medical College and **DR.S.BALAMEENA MD., DCH., DM,** Assistant Professor, Madras Medical College, for their guidance, meticulous supervision and constant support in doing my study.

I would like to thank my unit assistant professors,

DR.R. SOMASEKAR MD DCH,

DR . S. PARIVARDHINI MD., DCH.,

DR. P. SATHYAMOORTHY MD., DCH,

DR . N. RATHNAVELU MD.,DCH,

for their meticulous guidance and support throughout the study.

I am extremely thankful to Dr.S.Luke Ravi,M.D.,DCH., Registrar, for his valuable suggestions, invaluable help and guidance in doing this work.

I am greatly indebted to Dr.K. Nedunchezhian, M.D.,DCH., for his support and guidance in doing this study.

I sincerely thank all the children and their parents who have submitted themselves for this study and who made this study possible.

CONTENTS

INTRODUCTION

Arthritis is not a disease by itself but it is a manifestation of internal disease.

Juvenile idiopathic arthritis is the most common cause of chronic arthritis in childhood. It is a heterogenous disease with three onset types – ligoarticular, polyarticular, systemic onset. The major morbidity is related to chronic synovitis, joint destruction and drug toxicity. A better understanding of clinical and immunological profile will result in early diagnosis, prompt treatment and reduction in morbidity

ETIOLOGY. (3),(8)

The etiology of this type of chronic arthritis in children is unknown. At least two necessary events are postulated: immunogenetic susceptibility and an external, presumably environmental, trigger. Specific HLA subtypes confer degrees of susceptibility, or indeed protection, depending on the age of the child. Possible external triggers include viruses (parvovirus B19, rubella, Epstein-Barr virus), host hyperreactivity to specific self antigens (type II collagen), and enhanced T-cell reactivity to bacterial or mycobacterial heat shock proteins.

EPIDEMIOLOGY. (8)

The incidence of JRA is ≈13.9/100,000 children/yr among white children ≤15 yr of age, with a prevalence of ≈113/100,000 children. A report from western Australia, (7) estimates a much higher prevalence of 400/100,000 based on sequential examinations of school children by a pediatric rheumatologist. A report from UK , incidence in west 6-8 cases/100000.(23)

Different racial and ethnic groups have varying frequencies of the subtypes of JRA. African-American children may be older at onset and less likely to have elevated antinuclear antibody (ANA) titers or develop chronic uveitis

- Pathogenesis and Etiology of JRA: Multi-factorial
  - Genetic, Hormonal, Immunologic
  - Pathogenesis
- Characterized by chronic inflammation of the synovium;
- Presence of articular cartilage damage;
- Accompanied by extra-articular systemic manifestations.
  - Heterogeneity of JRA
- At least 3 primary types of onset of JRA:
  - Pauciarticular (Oligoarticular)

- Polyarticular and
- Systemic
- Genetic

- Basis of immune distinction between self and non-self is
- the major histocompatibility complex (MHC) that in
- humans is called the human leukocyte antigen (HLA).
- HLA system comprises a family of polymorphic genes
- located on the short arm of chromosome 6.
- Polymorphisms of JRA suggest a non-mendelian inheritance.

- Hormonal Factors

- Differences in the sex ratio of JRA subtype onset
- Pre-adolescent or post-adolescent peaks

- Immune Mechanisms

- Disease process involves loss of tolerance towards auto-
- antigens →chronic synovitis;
- Production of auto-antibodies:

- Anti-nuclear antibodies (ANA): associated with increased risk of iridocyclitis (eye inflammation);

- Rheumatoid factors (RF): auto-antibodies directed against the Fc fragment of IgG (associated with ~10% of polyarticular JRA);

- Complement activation by circulating immune complexes may also contribute to the disease process.

  - Immune Mechanisms

  - Cytokines: act on the immune system and other cells to initiate and sustain inflammation:

  - Intercellular mediators: Interleukin-1 (IL-1), IL-6, and tumor necrosis factor-alpha (TNF-$\propto$);

  - Immunomodulatory cytokines produced by T-cells $\rightarrow$ Interferon gamma (IFN-γ), IL-4, IL-2.

CLASSIFICATION OF JRA

- ACR Criteria (1) ,(6)

  - Age at onset: < 16 years of age;

  - Arthritis - swelling or effusion or the presence of 2 or more of the following

signs:

- Limitation of range of motion,
- Tenderness or pain on motion and
- Increased heat in one or more joints;

- Duration of disease ≥ 6 weeks;
- Onset type is defined by the type of disease in the first 6months:

- Oligoarticular (Pauciarticular) < 5 inflamed joints;
- Polyarticular: ≥ 5 inflamed joints;
- Systemic onset: arthritis with characteristic fever.

- Exclusion of other forms of childhood arthritis.

To classify these patients in well-defined diagnostic categories, a task force of the International League against Rheumatism (ILAR) proposed a new classification with precise criteria with the aim of achieving as much homogeneity within categories as possible in order to facilitate communication, clinical research and patient care**.**

The International League of Associations for Rheumatology (ILAR) classification of juvenile idiopathic arthritis (JIA) recognizes 8 categories(4), (5) :

1. Systemic arthritis,
2. Oligoarthritis ,
3. Extended oligoarthritis,
4. Polyarthritis [rheumatoid factor (RF) positive],
5. Polyarthritis (RF negative),
6. Enthesitis related arthritis,
7. Psoriatic arthritis,
8. and “other arthritis.”

General Definition of JIA

Juvenile idiopathic arthritis is arthritis of unknown etiology that begins before the 16th birthday and persists for at least 6 weeks; other known conditions are excluded.

Exclusions

The principle of this classification is that all categories of JIA are mutually exclusive. This principle is reflected in the list of possible exclusions for each category:

a. Psoriasis or a history of psoriasis in the patient or first degree relative.

b. Arthritis in an HLA-B27 positive male beginning after the 6th birthday.

c. Ankylosing spondylitis, enthesitis related arthritis, sacroiliitis with inflammatory bowel disease, Reiters syndrome, or acute anterior uveitis, or a history of one of

these disorders in a first-degree relative.

d. The presence of IgM rheumatoid factor on at least 2 occasions at least 3 months apart.

e. The presence of systemic JIA in the patient.

The application of exclusions is indicated under each category, and may change as new data become available

Categories

Systemic Arthritis

Definition: Arthritis in one or more joints with or preceded by fever of at least 2 weeks' duration that is documented to be daily ("quotidian") for at least 3 days, and accompanied by one or more of the following:

1. Evanescent (nonfixed) erythematous rash
2. Generalized lymph node enlargement
3. Hepatomegaly and/or splenomegaly
4. Serositis

Exclusions: a, b, c, d.

Oligoarthritis

Definition: Arthritis affecting one to 4 joints during the first 6 months of disease. Two subcategories are recognize

1. Persistent oligoarthritis: Affecting not more than 4 joints throughout the disease course

2. Extended oligoarthritis: Affecting a total of more than 4 joints after the first 6 months of disease

Exclusions: a, b, c, d, e.

Polyarthritis (Rheumatoid Factor Negative)

Definition: Arthritis affecting 5 or more joints during the first 6 months of disease; a test for RF is negative.

Exclusions: a, b, c, d, e.

Polyarthritis (Rheumatoid Factor Positive)

Definition: Arthritis affecting 5 or more joints during the first 6 months of disease; 2 or more tests for RF at least 3 months apart during the first 6 months of disease are positive.

Exclusions: a, b, c, e.

CLINICAL MANIFESTATIONS.

Initial symptoms may be subtle or acute, and often include morning stiffness and gelling, easy fatigability, particularly after school in the early afternoon, joint pain later in the day, and objective joint swelling. The involved joints are often warm, resist full range of motion, are painful on motion, but are not usually erythematous.

Oligoarthritis (pauciarticular disease) predominantly affects the joints of the lower extremities, such as the knees and ankles . Often, only a single joint is involved at onset. Isolated involvement of upper extremity large joints is not characteristic of this

type of onset. Involvement of the hip is almost never a presenting sign of JRA. Hip disease may occur later, particularly in polyarticular JRA, and is often a component of a deteriorating functional course

Polyarthritis (polyarticular disease) is generally characterized by involvement of both large and small joints of both upper and lower extremities. As many as 20–40 joints may be affected in the more severely involved child, although inflammation of only ≥5 joints is required as a criterion for classification of this type of onset. Polyarticular disease may resemble the characteristic presentation of adult rheumatoid arthritis and the HLA profile is often similar. **Rheumatoid nodules** on the extensor surfaces of the elbows and over the Achilles tendons, while unusual, are associated with a more severe course. **Micrognathia** reflects chronic temporo mandibular joint disease. Cervical spine involvement of the apophyseal joints occurs frequently with a risk of atlantoaxial subluxation and potential neurologic sequelae.

Systemic-onset disease is characterized by arthritis and prominent visceral involvement that includes hepatosplenomegaly, lymphadenopathy, and serositis, such as a pericardial effusion. It is characterized by a quotidian fever with temperatures to ≥39°C, sometimes followed by mildly hypothermic temperatures for ≥2 wk. Each febrile episode is frequently accompanied by a characteristic faint, erythematous, macular rash; these evanescent **salmon-colored lesions** may be linear or circular, from 2–5 mm in size, and are often distributed in groups with a linear distribution most commonly over

the trunk and proximal extremities . This rash is not pruritic. Its most diagnostic feature is its transient nature, with a group of lesions usually lasting <1 hr. The **Koebner phenomenon,** which is cutaneous hypersensitivity to superficial trauma resulting in a localized recurrence of the rash, is suggestive, but not diagnostic, of systemic-onset disease. Heat, such as a warm bath, also evokes a reappearance of the rash.

DIAGNOSIS

The diagnosis is greatly aided by the ACR Classification Criteria and its subclassification of course of the disease, and by the meticulous clinical exclusion of other articular diseases. There is often no one pathognomonic finding for these disorders. The classic intermittent fever in association with the typical rash and objective arthritis is highly suggestive of systemic-onset JRA. The diagnosis is based on a history compatible with inflammatory joint disease and a physical examination that confirms the presence of arthritis (see Table 154-1). Some children have persistent arthralgia despite repeated normal physical examinations. Although they do not fulfill the diagnostic criteria for JRA initially, that diagnosis may become evident as late as ≥2 yr after the initial presentation. Laboratory abnormalities characteristic of inflammation include elevated erythrocyte sedimentation rate (ESR) and C reactive protein (CRP), leukocytosis, thrombocytosis, and the anemia of chronic disease, which support the diagnosis.

DIFFERENTIAL DIAGNOSIS

Arthritis can be the presenting manifestation for any of the rheumatic diseases of childhood, including systemic lupus erythematosus (SLE) , juvenile dermatomyositis , sarcoidosis , and the vasculitic syndromes . In scleroderma, swelling along the digits early in the disease is not confined to the joints and subsequent loss of motion may occur without any articular swelling. **Acute rheumatic fever** is characterized by exquisite joint pain and tenderness, a remittent fever, and polyarthritis that is usually migratory.

Autoimmune hepatitis can be associated with an acute arthritis. **Lyme disease** should be considered in children living in or visiting endemic areas who present with oligoarthritis. Although a history of tick exposure, preceding flu-like illness and subsequent rash should be sought, these are not always present. Monarticular arthritis unresponsive to anti-inflammatory treatment may be the result of chronic mycobacterial or other infection; the diagnosis is often established only by synovial biopsy. Joint pain and swelling of a single joint suggests trauma or infection; correlation with history, laboratory, and radiologic findings helps exclude these possibilities.

Conditions Causing Arthritis or Extremity Pain

RHEUMATIC AND INFLAMMATORY DISEASES

Juvenile rheumatoid arthritis

Systemic lupus erythematosus

Juvenile dermatomyositis

Polyarteritis

Vasculitis

Scleroderma

Sjögren syndrome

Behçet disease

Overlap syndromes

Wegener granulomatosis

Sarcoidosis

Kawasaki syndrome

Henoch-Schönlein purpura

SERONEGATIVE SPONDYLOARTHROPATHIES

Juvenile ankylosing spondylitis

Inflammatory bowel disease

Psoriatic arthritis

Reactive arthritis associated with urethritis, iridocyclitis, and mucocutaneous lesions

INFECTIOUS ILLNESSES

Bacterial arthritis (septic arthritis, *Staphylococcus aureus,* pneumococcus, gonococcus, *H. influenzae*)

Lyme disease

Viral illness (parvovirus, rubella, mumps, Epstein-Barr virus, hepatitis B)

Fungal arthritis

Mycobacterial infection

Spirochetal infection

Endocarditis

REACTIVE ARTHRITIS

Acute rheumatic fever

Reactive arthritis (post-infectious from *Shigella, Salmonella, Yersinia, Chlamydia,* or meningococcus)

Serum sickness

Toxic synovitis of the hip

Postimmunization

IMMUNODEFICIENCIES

Hypogammaglobulinemia

Immunoglobulin A deficiency

Human immunodeficiency virus

CONGENITAL AND METABOLIC DISORDERS

Gout

Pseudogout

Mucopolysaccharidoses

Thyroid disease (hypothyroidism, hyperthyroidism)

Hyperparathyroidism

Vitamin C deficiency (scurvy)

Hereditary connective tissue disease (Marfan syndrome, Ehlers-Danlos syndrome)

Fabry disease

Farber disease

Amyloidosis (familial Mediterranean fever)

BONE AND CARTILAGE DISORDERS

Trauma

Patellofemoral syndrome

Hypermobility syndrome

Osteochondritis dissecans

Avascular necrosis (including Legg-Calvé-Perthes disease)

Hypertrophic osteoarthropathy

Slipped capital femoral epiphysis

Osteolysis

Benign bone tumors (including osteoid osteoma)

Histiocytosis

Rickets

NEUROPATHIC DISORDERS

Peripheral neuropathies

Carpal tunnel syndrome

Charcot joints

NEOPLASTIC DISORDERS

Leukemia

Neuroblastoma

Lymphoma

Bone tumors (osteosarcoma, Ewing sarcoma)

Histiocytic syndromes

Synovial tumors

HEMATOLOGIC DISORDERS

Hemophilia

Hemoglobinopathies (including sickle cell disease)

MISCELLANEOUS DISORDERS

Pigmented villonodular synovitis

Plant-thorn synovitis (foreign body arthritis)

Myositis ossificans

Eosinophilic fasciitis

Tendinitis (overuse injury)

Raynaud phenomenon

PAIN SYNDROMES

Fibromyalgia

Growing pains

Depression (with somatization)

Reflex sympathetic dystrophy

Regional myofascial pain syndromes

Physical findings may suggest other diagnoses. Acute onset of a synovial effusion and an inflamed joint suggests bacterial infection. Chondromalacia of the patella or related femoropatellar syndromes can cause knee pain and instability. Tenderness over insertion of ligaments and tendons and lower extremity arthritis, especially in a male, raises the possibility of a spondyloarthropathy. **Psoriatic arthritis** can present with limited joint involvement in an unusual distribution (e.g., small joints of the hand and ankle) prior to onset of cutaneous disease. Until psoriasis develops, which may only occur years after the arthritis, the diagnosis can only be suspected (especially with a

positive family history). Isolated hip pain with limited motion raises the possibility of suppurative arthritis or osteomyelitis, Legg-Calvé-Perthes disease, slipped capital femoral epiphysis, or chondrolysis of the hip Repeated episodes of joint pain and swelling, especially in lower extremity joints, usually lasting <1 wk with complete resolution between episodes, can occur in juvenile episodic arthritis, often attributed to **hypermobility.**

Inflammatory bowel disease may present with oligoarthritis, usually affecting joints in the lower extremities, and unexplained anemia. Arthritis can also follow an enteric infection . Unexplained arthralgia accompanied by a fear of returning to school suggests school phobia as a cause for the arthralgia.

Less commonly, other diseases can produce joint symptoms and signs. Children with undiagnosed **leukemia** may have joint pain resulting from metaphyseal expansion of the malignant infiltration of the bone marrow, sometimes months before demonstrating peripheral blood lymphoblasts. Examination of such a child usually reveals a deeper pain to palpation of the bone; bone marrow aspiration confirms the diagnosis. Some diseases, such as cystic fibrosis, diabetes mellitus, and the glycogen storage diseases have associated arthropathies (see Chapter 168). Swelling that extends beyond the joint can be a sign of lymphedema, which may rarely coexist with JRA, or Henoch-Schönlein purpura. A peripheral arthritis indistinguishable from JRA occurs in the humoral immunodeficiencies, such as common variable immunodeficiency and X-

linked agammaglobulinemia. Skeletal dysplasias associated with a degenerative arthropathy are diagnosed by characteristic radiologic abnormalities.

LABORATORY FINDINGS

Hematologic abnormalities often reflect the degree of systemic or articular inflammation, with elevated white blood cell and platelet counts and decreased hemoglobin concentration and mean corpuscular volume. The ESR and CRP usually mirror these findings, along with elevated serum immunoglobulins. It is not unusual for the ESR to be normal in some children with chronic arthritis. Because platelets are an acute-phase reactant, a high ESR and neutropenia with a low platelet count may be a clue to leukemia as a cause of periarticular swelling and pain.

Elevated ANA titers are present in at least 40–85% of children with oligoarticular or polyarticular JRA, but are unusual in children with systemic-onset disease. ANA seropositivity is associated with increased risk for the development of **chronic uveitis** in a child with limited joint disease.

Rheumatoid-factor (RF) seropositivity may be associated with onset of polyarticular involvement in an older child (≈8%) and the development of rheumatoid nodules, and with a poor overall prognosis with eventual functional disability. Both ANA and RF seropositivity occur in association with transient events during childhood, such as viral infections, particularly Epstein-Barr virus. Seropositivity for both ANA and

RF must be defined at a specific titer in relation to accepted positive and negative controls and a laboratory-defined coefficient of variation.

Bone mineral metabolism and skeletal maturation are often abnormal in children with JRA with a history of active synovitis, relatively independent of onset type or course subtype, and predominantly affect appendicular cortical bone, with less effect on the normal age-related development of trabecular bone. Increased levels of cytokines such as IL-6 may decrease bone formation (reflected by decreased serum levels of osteocalcin and bone-specific alkaline phosphatase) to a greater extent than bone resorption (which may also be decreased, as reflected by decreased levels of tartrate-resistant acid phosphatase). Abnormalities of skeletal growth become most prominent during the pubertal growth spurt and in postpubertal children (Tanner stages IV–V) and lead to failure of the child to achieve acceptable peak bone mass (osteopenia).

Early radiographic changes of arthritis include soft tissue swelling, regional osteoporosis, and periosteal new-bone apposition about affected joints. Regional epiphyseal closure may be stimulated, and local bone growth decreased. In large joints, linear growth may be accelerated and limb length discrepancy, especially with involvement of a knee, becomes prominent.

Continued active disease may lead to subchondral erosions and narrowing of cartilage space, especially in small tubular bones, with varying degrees of bony destruction and, potentially, fusion. Characteristic radiographic changes in cervical

spine, most frequently in the neural arch joints at C2-3 may progress to atlantoaxial subluxation. MRI studies may be helpful to evaluate both joint and soft tissues and are more sensitive to early, minimal changes than is plain radiography.

Treatment

The aims of good management of JIA are to prevent joint destruction, promote growth and development and management of complications*3*.

Effective management of JIA needs a multidisciplinary team approach with inputs from a pediatric rheumatologist, who will liaise with the local general pediatrician or general physician, ophthalmologist, nurse specialist, physio-therapist, occupational therapist, orthopedic surgeon, podiatrist, clinical and social worker. The medications used to treat JIA are divided into first-line agents, second-line agents, immunosuppressive agents, biologicals and steroids.

First-line agents

Nonsteroidal anti-inflammatory agents:-

Nonsteroidal anti-inflammatory agents (NSAIDs) decrease inflammation by inhibiting the synthesis of prostaglandins. Half of the children whorespond to NSAIDs do so after 2 weeks and two thirds by a month; thus if a patient has minimal response, it may be advantageous to change to an NSAID of another chemical class after a month. All currently used drugs inhibit the activity of both cycloxygenases (COXs) I and II.

COX-II specific NSAIDs are not yet licensed for use in children in most countries, as experience with these drugs are scarce**4**.

Ibuprofen : 30-40 mg/kg/d

Naproxen: 10-15mg/kg/d

Indomethacin: 1-3 mg/kg/d

Aspirin : 70-100mg/kg/d

Second line agents

Disease Modifying Anti Rheumatic Drugs (DMARDs)

1. Methotrexate:

Of current therapies, once a week low dose methotrexate has emerged as the therapeutic agent of choice for children who fail to respond to adequate administration of an NSAID.

Guidelines for methotrexate therapy (9) :

1. before starting therapy a baseline investigations like blood counts, ESR, CRP, liver & renal function tests, chest x ray should be done.
2. coadminister folinic acid 1 mg daily
3. monitor liver enzymes and blood counts

2. sulfasalazine
3. Hydroxychloroquine

Immunosuppressives

Corticosteroids

The use of corticosteroids in JIA falls into the following four categories Intra-articular: In children with oligoarticular disease and involvement of one or two joints, injection of the affected joints can lead to longterm remission in 50% of the patients so treated. In children with polyarticular joint involvement or systemic onset disease with multiple joint involvements, injection can be used if one joint is swollen out of proportion to the others or if the child is developing a flexion contracture around the joint. Corticosteroid injections can prevent and reverse the development of flexion contractures and decrease the development of limb length discrepancies in children who have knee involvement. The molecule available to us istriamcinolone acetonide. Triamcinolone hexacetonide is the preferred drug but is not available in India

Dose: - The dosage regime for triamcinolone hexacetonide currently used is 1 mg/kg for large joints (knees, hips, and shoulders) and 0.5 mg/kg for smaller joints (ankles, wrists, and elbows). For the hands and feet, 1–2 mg/joint for MCPs/MTPs, and 0.6–1 mg/joint for PIPs may be used. If triamcinolone acetonide is being used, doses are doubled**6**.

Topical Steroids: Topical corticosteroids preparations are used in children who have uveitis.

Oral: Rarely, patients with severe systemic or polyarticular disease may require long-term oral corticosteroid use, but efforts must be made to keep the dose as low as possible. The inability to taper corticosteroid therapy is an indication to start second-line therapy and/or immuno-suppressive medications.

Intravenous steroid “pulse” therapy: Methylprednisolone given intravenously over one hour, can be useful in select children with systemic onset disease to treat severe systemic symptoms and minimize daily steroid dosing

Recent arrivals in JIA management (Role of biologicals):-

Tumor necrosis factor (TNF-Alpha) inhibitors:
-Etanercept,Infliximab,Adalivumab etc

Interleukin 1 antagonists: -Anakinra

Others: - Anti-CD 20 agent rituximab, CTLA-4

Ig abatacept, anti-IL6 tocilizumab, Anti-CD22 and anti-lymphostat B**7**.

TNF Antagonists: -(Etanercept and infliximab)

Action: - Etanercept binds to TNF alpha and

prevents binding to cellular receptors while

Autologous stem cell therapy

Rationale for therapy:

There is substantial evidence that abnormal auto reactive T cell clones have an important role in the pathogenesis of JIA.Massive immunosuppression to suppress these clones may induce disease remission. Bone marrow reconstitution with non-auto reactive

T cell precursors would produce a normal T cell repertoire without memory T cells**(11)**.

Physiotherapy and Occupational Therapy

Therapists are critical to restore function and strength of affected joints and musculature. They plan a treatment program that incorporates exercises, stretches for the

joints, and activities of daily living. The occupational therapist provides custom made splints to maintain hand function, joint position, and assist children whose disability requires modification of the environment. Physiotherapy provides pain relief, in addition to improving joint range and muscle strength. Finally therapist is usually the key person to educate the parents, and school personnel to ensure integration of therapy goals into the child's daily routine.

Specific therapy (14), (15)

	Step 1	**Step 2**	**Step 3**	**Step 4**
Oligoarticular	NSAID (2-4wks)	Change NSAID	Intra articular (1-2 jts) Sulphasalazine (3-4/extended)	Methotrexate, HCQ
Polyarticular	NSAID 2-4wks	Change NSAID	Methotrexate/ DMARD	Steroids, immunossuppresives
Systemic	Pulse/oral steroids NSAID	Change NSAID	Oral steroids	

Complications of JIA

The major systemic complications of JIA are

1. Uveitis - majority occurs in oligoarticular type. The greatest risk of uveitis occurs within the first 2 yrs after the onset of JIA and the risk declines by 8 yrs

after arthritis onset (12)

2. Macrophage activation syndrome

3. Growth retardation

4. Amyloidosis

Prognosis

Bad Prognostic factors in JIA (13)

SOJIA : Oligoarthritis,Polyarthritis,Psoriatic patients, ERA , Fever, Polyarticular involvement, a high initial dose steroid requirement, steroid dependence and thrombocytosis at the end of 6 months.

Oligoarthritis : Severity of arthritis within the first 2 years

Polyarthritis : Positive rheumatoid factor

REVIEW OF LITERATURE

1. D Sircar et al studied the clinical manifestation, severity and immunological features of JIA and its influence on growth and cardiac involvement. Sample size was 50. Results :28% were oligoarticular, 22%systemic onset, 18% post streptococcal reactive arthritis, 10% rheumatoid factor + ve, 20% rheumatoid factor –ve, female predominance in polyarticulartype, male predominance in oligoarticular and systemic onset type, 65 had uveitis. Indian Paediatrics 2006

2. Gurkirpal singh et al adapted the Stanford health assessment questionnaire in children with JIA to measure the health and functional status. Sample size was 72. Results : 9 patients were inactive, 32 had mild disability, 24 moderate , 7 had severe disability. Study concluded that Childhood Health Assessment Questionnaire is a valid, reliable and sensitive instrument for measuring functional status in children with JIA. Arthritis and Rheumatism 1994

3. Oen K et al studied the predictors of disability. Patients were selected if they were > or < 8 yers, onset of arthritis < 5 yrs or > 5 yrs . results : male sex correlated with worse outcome in systemic onset JIA, but less disability in rheumatoid factor +ve polyarticular JIA. Younger age at onset predicted longer active disease duration in oligoarticular and rheumatoid factor –ve polyarticular JIA and shorter active disease duration in systemic onset.variables predictive of long term

outcome are specific for each type the most important predictors were age at onset and sex. J Rheumatol 2003,mar;30(3):585-93

4. Amita agarwal et al studied the outcome in JIA in India. Indian pediatrics 2004. There were 214 children in study.76 oligo, 93 polyarticular, 45 systemic with 135 of them boys. At last follow up 128 had active disease, 58 stable disease, 28 inactive. polyarticular had the worst outcome with only 3 out of 93 having inactive disease, 13/76 in oligoarticular, 12/45 in systemic onset.

5. L M A Jansena, D van Schaardenburga, I E van der Horst-Bruinsmab, *Ann Rheum Dis 2000;59:223-226*

To find disease parameters that can predict the functional capacity of patients with early rheumatoid arthritis (RA) at the first visit to the rheumatologist and one year after entry.

METHODS Patients referred to the outpatients clinic between 1995 and 1996, with a symptom duration of less than three years and fulfilling the American Rheumatism Association 1987 revised criteria for RA within one year after entry were included. Assessments of the duration of morning stiffness, the Disease Activity Score (DAS: a composite score based on erythrocyte sedimentation rate (ESR), number of painful and swollen joints and patient global assessment), pain (Visual Analogue Scale), and the Assessment Questionnaire (HAQ) were performed every three months.

RESULTS 133 patients were included in the study. The median duration of complaints was three months (range 0–35) and the median HAQ score at entry was 1.12 (range 0–3). There was no correlation between duration of complaints and the HAQ at entry (r = 0.01). An HAQ score under the 50th percentile at entry could be predicted correctly for 74% of the patients by entry DAS and C reactive protein concentration, and at one year could be predicted correctly for 73% of the patients by entry HAQ and pain score.

CONCLUSION Disease activity is strongly correlated with a lower functional capacity at entry, whereas disease duration is not. The functional status at entry is a good predictor for functional status at one year

Objective. Inflammatory arthritis in childhood is variable in terms of both presentation and outcome. This analysis describes disease activity in children with juvenile idiopathic arthritis (JIA) during the first year following presentation to a paediatric rheumatologist and identifies predictors of moderate to severe disability [defined using a Childhood

HAQ (CHAQ) score >0.75] at 1 year.

Methods Demographics, disease features, joint count, CHAQ, physician's global assessment, parent's general evaluation of well-being (PGE), ESR and treatment, are

collected at first presentation, 6 months and then yearly. Independent predictors of CHAQ >0.75 at 1 year in children diagnosed with JIA were identified

Results. Seven hundred and forty children with JIA were included; median age at presentation 7.6 years, 64% girls. During the first year, 85% received NSAIDs, 70% IA corticosteroids, 47% MTX and 27% systemic steroids (oral or i.v.). Median presenting CHAQ score was 0.63 and decreased to 0.25 at 1 year; 32% had CHAQ >0.75 at 1 year. The strongest predictor of CHAQ >0.75 at 1 year was CHAQ >0.75 at presentation (odds ratio 3.92; 95% CI 2.17, 7.09). Additional predictors included female gender **Conclusion.** Although CHAQ score improved in most children, the strongest predictor of persistent disability at 1 year was moderate to severe disability at first presentation. Follow-up beyond 1 year will assess whether CHAQ at presentation will continue to be a predictor of future poor outcome.

6. Surjit singh et al **,** clinical an immunological profile, Indian pediatrics 1999

Objective: To study the clinical and immunological profile of children with juvenile rheumatoid arthritis (JRA). **Design:** Retrospective hospital based study. Setting: Tertiary level center of North India. Subjects: 74 patients attending the Pediatric Rheumatology and Immunology Clinic over last 5 years.

Results: The patients were aged between 9 months to/2 years with malefemale ratio of 1.8:1. Eleven (14.9%) patients had systemic onset JRA, 28 (37.8%) had

polyarticular onset type and 35(47.3%) had pauciarticular onset type JRA. Uveitis was present only in one patient and rheumatoid nodules were present in 4(5.4%) patients. Rheumatoidfactor was positive in 2(2.7%) and antinuclear antibody was present in one patient only. RIA-B27 was positive in 4 children. Two patients developed amyloidosis.

Conclusion: The clinico-immunological profile of JRA at Chandigarh appears to be somewhat different from that reported from other centers in India.

7. Prognostic factors in juvenile rheumatoid arthritis: a case-control study revealing early predictors and outcomeBerit FlatØ, Anna Smerdel, Center for Rheumatic Diseases, Rikshospitalet University Hospital, Oslo, Norway.

Objective: To describe the physical and psychosocial outcome in patients with juvenile rheumatoid arthritis (JRA), compared with subjects in the general population, Predictors of persistent disease and joint erosions were: young onset age and large numbers of affected joints, long duration of elevated erythrocyte sedimentation rate (ESR), and positive IgM rheumatoid factor (RF) within the first 6 months.

Additionally, persistent disease was predicted by the presence of DRB1*08, and joint erosions were predicted by symmetric arthritis and DRB1*08 and HLA-B27 in combination. DRB1*01 was a predictor of joint erosions in the pauciarticular onset type

(n = 163). Predictors of physical disability were: female sex, symmetric arthritis, hip joint involvement, long duration of elevated ESR and IgM RF.

C**onclusion**: Compared with healthy controls, patients with JRA had impaired physical health and lower employment rates after more than 11 years of disease duration. Elevated ESR, extensive and symmetric arthritis, positive IgM RF, DRB1*08, DRB1*01, HLA-B27 and DRB1*08 in combination, early onset, and female sex were early risk factors for an unfavorable outcome.

STUDY JUSTIFICATION

Though Juvenile idiopathic arthritis is not a rare disease its true incidence and prevalence are not available. It is a disease of variation in terms presentation and outcome. Comparison with other studies is difficult due to variation in classification, presentation and changing treatment. Our hospital also lacks such study.

AIM

To study the clinical and laboratory profile in children < 12 years with juvenile idiopathic arthritis and to assess their health and functional status for a period of one year

METHODOLOGY

STUDY DESIGN : Descriptive study

PLACE : Rheumatology OP and general ward, Institute of Child Health

STUDY POPULATION : Children < 12 years with juvenile idiopathic arthritis

STUDY PERIOD : 2 years

INCLUSION CRITERIA : all diagnosed cases of juvenile idiopathic arthritis based on International League of Associations for Rheumatology (ILAR) criteria

EXCLUSION CRITERIA :children with juvenile idiopathic arthritis associated with other chronic illness

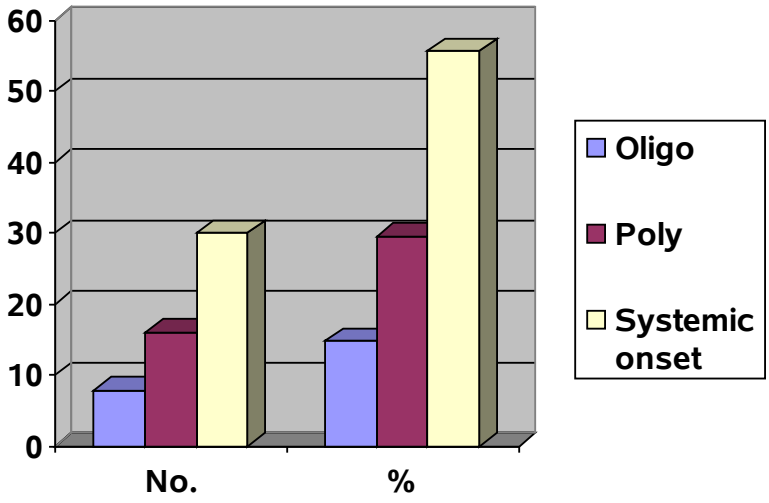
MANUOEVERE : All children under inclusion criteria are recruited from OP and ward. They are grouped into types based on ILARcriteria .They are investigated and assessed for functional status based on Childhood Health Assessment Questionnaire and Disease Activity Score 28. They are followed up for one year and re-assessed for their functional status

STATISTICAL ANALYSIS

The statistical method applied were using the patients characteristics, symptom profile, lab profile, scoring systems and each were matched against degree of disability. Datas were entered in Microsoft excel sheet and analysed using SPSS ver 11 for windows , Epi info , and chi square and p values were obtained

OBSERVATION

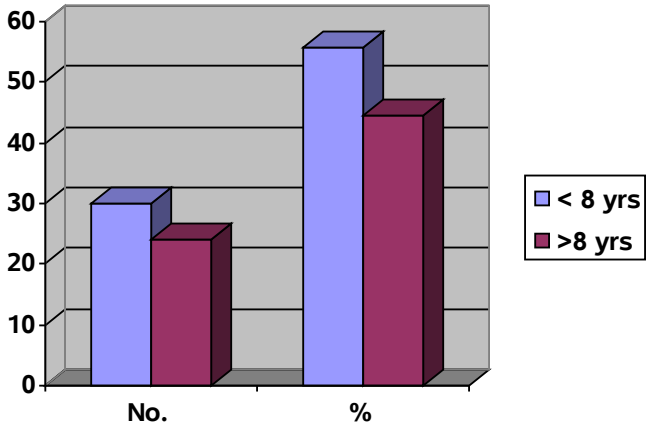
Type	No.	%
Oligo	8	14.8
Poly	16	29.6
Systemic onset	30	55.6



Total no. of patients were 54. Out of which 8 (14.8%) were of oligo-articular type, 16 (29.6%) were polyarticular type and 30 (55.6%) were systemic onset.

Age	No.	%

< 8 yrs	30	55.6
>8 yrs	24	44.4



Out of 54 children, 30 (55.6%) were of <8 yrs and 24 (44.4%) were of age > 8 yrs .mean age was 7.83 yrs.

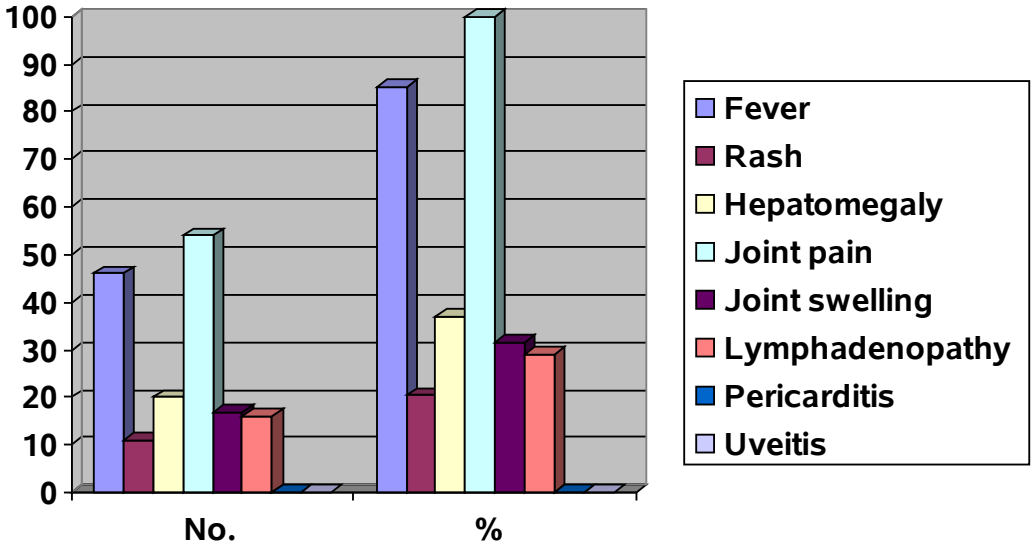
sex	**No.**	**%**
Male	28	51.9
Female	26	48.1

Out of 54 children , 28 (51.9%) were males and 26 (48%) were females.

Onset	No.	%
< 5 yrs	30	55.6
>5yrs	24	44.4

Out of 54 children, 30 (55.6%) had disease onset less than 5 yrs duration whereas 24 (44.4%) had onset more than 5ys

Symptoms	No.	%
Fever	46	85.2
Rash	11	20.4
Hepatomegaly	20	37
Joint pain	54	100
Joint swelling	17	31.5
Lymphadenopathy	16	29
Pericarditis	0	0
Uveitis	0	0

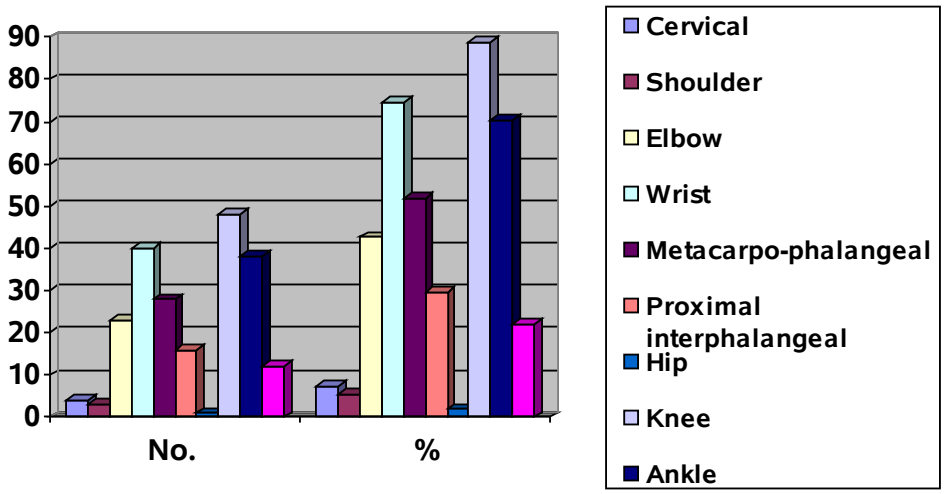


Among clinical features, fever was present in 46 (85.2%) children, 11 (20.4%) had rashes, 20(37%) had hepatomegaly, joint pain and swelling was present in 54 (100%) and 17 (31.5%) children respectively, 16 of them had lymphadenopathy.

None had involvement of heart and eyes.

Joint involvement	No.	%
Cervical	4	7.4
Shoulder	3	5.6
Elbow	23	42.6
Wrist	40	74.6
Metacarpo-phalangeal	28	51.9
Proximal interphalangeal	16	29.6
Hip	1	1.9
Knee	48	88.9

Ankle	38	70.4
Metatarsophalangeal	12	22.2

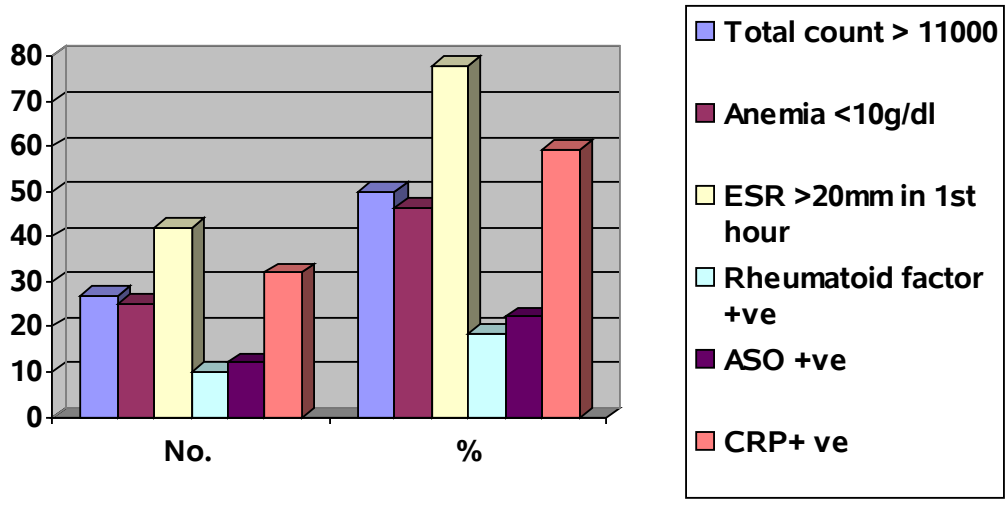


Almost every joint was involved in study population. Knee is the commonest joint involved. 40 cases (74.6%) had wrist involvement. Ankle involvement was found in 38 (70.4%) cases.23 (42.6%) children had involvement of elbow. There was evidence of small joint involvement, metacarpophalangeal -28 (51.9%), prox interphalangeal -16(29.6%), metatarsophalangeal-12(22.2%) children. Hip, shoulder and cervical joint involvement were also seen in few cases.

Articular presentation	**No.**	**%**
Symmetrical	33	61.1
Asymmetrical	21	38.8

33 (61.1%) out of 54 children had symmetrical joint involvement and the remaining 21(38.8%) had asymmetrical involvement of joints.

Hematological parameters	No.	%
Total count > 11000	27	50
Anemia <10g/dl	25	46.3
ESR >20mm in 1st hour	42	77.8
Rheumatoid factor +ve	10	18.5
ASO +ve	12	22.2
CRP+ ve	32	59.3



Out of 54 children, 50% had leucocytosis, anemia was present in nearly 50% of cases.ESR was elevated in 42 (77%) cases. Rheumatoid factor was positive in 10 cases. CRP was positive in two-thirds of cases and ASO was positive in 12 (22%) children.

Treatment	No.	%

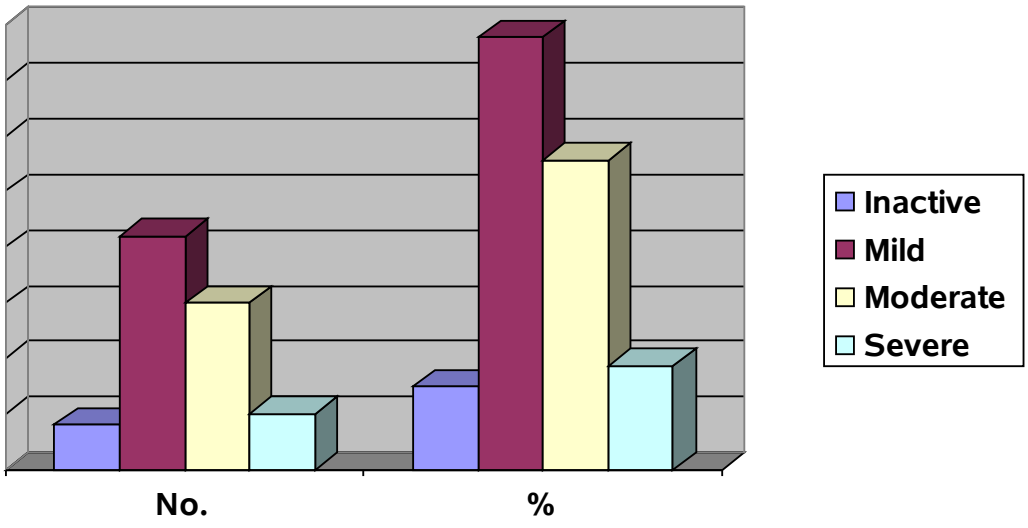
NSAIDS	54	100
Prednisolone	34	63
Methotrexate	46	85.2

All children received analgesics. Few children 34(63%) were started on short course steroids in view of disease activity . Subcutaneous methotrexate wasgiven in 46 (85.2%) children.

Measurement of functional status : –

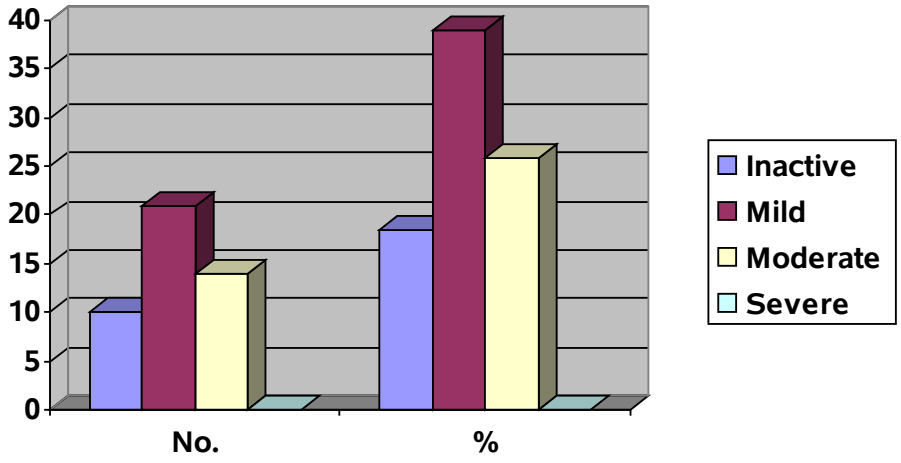
1.CHILDHOOD HEALTH ASSESSMENT QUESTIONAIRE

HAQ – 1(first visit)	**No.**	**%**
Inactive	4	7.4
Mild	21	38.9
Moderate	15	27.8
Severe	5	9.3



Children were assessed for their functional status using health assessment questionnaire in their initial visit and were graded accordingly.The mean score was 1.03 . 4 children did not have disability, 21 had mild disability, 15 had moderate disability and 5 cases had severe disability. 9 patients were not applicable as they were below 3 yrs.

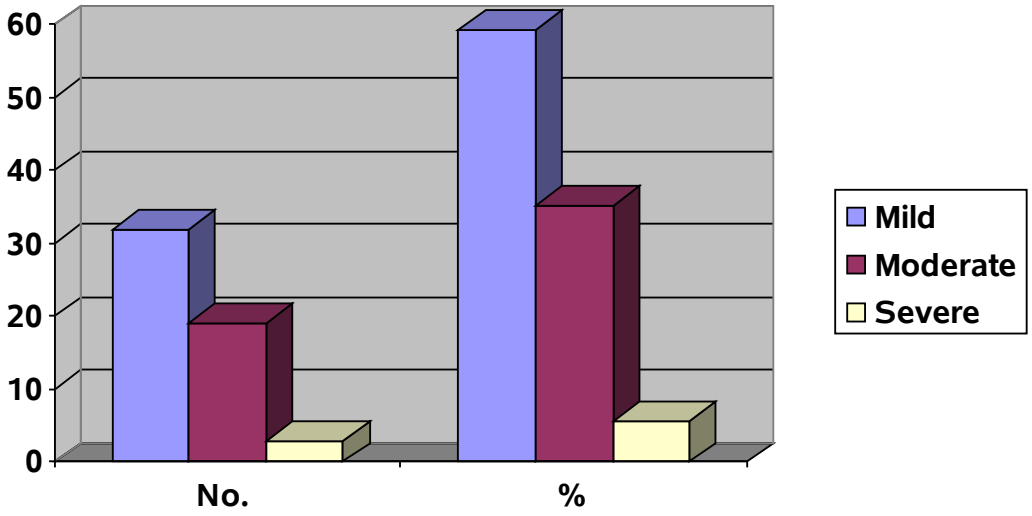
HAQ -2 (after 1 yr)	No.	%
Inactive	10	18.5
Mild	21	38.9
Moderate	14	25.9
Severe	0	0



After a period of 1 yr none had severe disability. 10 cases were found to be free of disability, 21 – mild, 14 – moderate. The mean score was 0.89

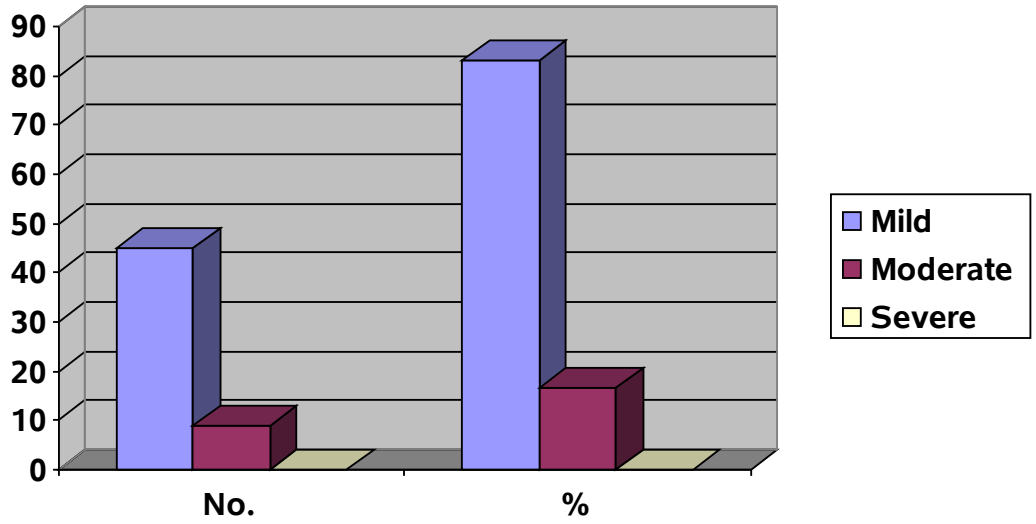
2. DISEASE ACTIVITY INDEX 28

DAS28 – 1 (first visit)	No.	%
Mild	32	59.3
Moderate	19	35.2
Severe	3	5.6



Out of 54 children, 32 (59%) had mild disease activity, 19 had moderate activity and 3 severe disease activity. The mean score was 2.85

DAS28 – 2(after 1 yr)	No.	%
Mild	45	83.3
Moderate	9	16.7
Severe	0	0



After a period of 1 yr, none of the children had severe disease activity. 45 (83%) had mild activity and 9 (16%) cases had moderate disease activity. The mean score was found to be 2.76 .

	Oligoarticular	**Polyarticular**	**Systemic onset**	**P value**
Age < 8 yrs	3	7	20	o.177
>8 yrs	5	9	10	

Out of 30 cases who were < 8 yrs, 3 were of oligoarticular, 7 polyarticular, 20 systemic onset. Among those who were > 8 yrs, 5 were oligoarticular, 9 polyarticular, 10 systemic onset. There was no statistical significance

	Oligoarticular	**Polyarticular**	**Systemic onset**	**P value**
Male	6	9	13	0.258
Female	2	7	17	

Among 28 males, 6 were oligoarticular, 9 polyarticular, 13 systemic onset. Among 26 females, 2 were oligoarticular, 7 polyarticular, 17 systemic onset. There was no statistical significance .

	Oligoarticular	**Polyarticular**	**Systemic onset**	**P value**
Disease onset <5yrs	3	8	19	0.369
>5yrs	5	8	11	

Children with early onset, 3 were oligoarticular, 8 polyarticular, 19 systemic onset. Those with late onset, 5 were oligoarticular , 8 polyarticular, 11 systemic onset type. There was no statistical significance.

	Oligoarticular	Polyarticular	Systemic onset	*p* value
Fever	5	12	29	**0.021 S**
Rash	0	1	10	**0.028 S**
Hepatomegaly	0	2	18	**0.000 S**
Joint pain	8	16	30	
Joint swelling	0	8	9	**0.044 S**
Lymphadenopathy	0	2	13	**0.01 S**

Fever was present in 5 cases of oligoarticular, 12 cases of polyarticular, 29 cases of systemic onset. **P value was 0.021 which is significant Rash** was not a feature in oligoarticular type. It was seen in 1 case of polyarticular, 10 cases of systemic type . **p value was 0.028 which was statistically significant.**

Hepatomegaly was seen in 2 cases of polyarticular, 18 cases of systemic type. It was not present in oligoarticular type. **P value was 0.00 which is statistically significant.**

Joint pain was seen in 16 cases of plyarticular , 30 cases of systemic onset 8 cases of oligoarticular.

Joint swelling was present in 8 cases of polyarticular, 9 cases of systemic onset. **P value was 0.044 which is statistically significant.**

Lymphadenopathy was present 2 cases of polyarticular and 13 cases of systemic onset type. It was not seen in oligoarticular type. **P value was 0.01 which is statistically**

significant

	Oligoarticular	Polyarticular	Systemic onset	P value
Shoulder	0	1	2	0.757
Elbow	2	8	13	0.502
Wrist	3	13	24	**0.038 S**
Metacarpophalangeal	0	10	17	**0.01 S**
Prox interphalangeal	0	4	12	0.079
Hip	0	0	1	0.665
Knee	8	13	27	0.371
ankle	4	13	21	0.286
metatarsophalangeal	0	8	4	**0.005 S**

Shoulder jt was involved in 1 case of polyarticular, 2 cases of systemic with no statistical significance.

Elbow was involved in 2 cases of oligoarticular, 8 cases of polyarticular, 13 cases of systemic type with no statistical significance.

Wrist is involved in 3 cases of oligoarticular,13 cases of polyarticular, 24 cases of systemic onset with **significant p value of 0.038**

Metacarpophalangeal jt was involved in 10 cases of polyarticular, 17 cases of systemic type. **P value was significant 0.01**

Proximal interphalangeal jt was involved in 4 cases of polyarticular, 12 cases of

systemic type with no statistical significance

Hip was involved in only 1 case of systemic type.

Knee was involved in 8 cases of oligoarticular, 13 cases of polyarticular, 27 cases of systemic type with no statistical significance.

Ankle was involved in4 cases of oligoartiarticular, 13 cases of polyarticular, 21 case of systemic type with no statistical significance

Metatarsophalangeal jt was involved in 8 cases of polyarticular, 4 cases of systemic type. **P value was significant 0.005**

	Oligoarticular	**Polyarticular**	**Systemic onset**	**P value**
Leucocytosis	0	6	16	**0.02 S**
Anemia	3	7	15	0.796
ESR	2	11	24	**0.01 S**
Rheumatoid factor + ve	0	5	5	0.165
ASO + ve	2	3	7	0.919
CRP + ve	4	6	22	0.053

Leucocytosis was seen in 6 cases of polyarticular, 16 cases of systemic type which was **statistically significant (p 0.02)**

Anemia was present in 3 cases of oligoarticular, 7 cases of polyarticular, 15

systemic type with no significance.

ESR was elevated in 2 cases of oligoarticular,11 cases of polyarticular, 24 cases of systemic type with **statistical significance p 0.01**

Rheumatoid factor was positive in 5 cases of polyarticular and systemic onset type each. It was negative in all cases of oligoarticular type . there is no statistical significance.

ASO was positive in 2 cases of oligoarticular ,3 cases of polyarticular, 7 cases of systemic type with no significance.

CRP was positive in 4 cases of oligiarticular, 6 cases of plyarticular, 22 cases of systemic type with no statistical significance

	Oligoarticular	**Polyarticular**	**Systemic onset**	**P value**
NSAIDS	8	16	30	-
Prednisolone	2	8	22	**.031 S**
Methotrexate	5	14	27	0.144

NSAIDS were used in all cases of oligo, poly and ststemic type.

Prednisolone was given in 2 cases of oligoarticular, 8 cases of polyarticular,22 cases of systemic onset type**. P value was significant 0.031**

Methotrexate was given in 5 cases of oligoarticular, 14 cases of polyarticular, 27 cases of systemic type with no significance

	HAQ - 1				P value
	Inactive	Mild	Moderate	Severe	
Oligoarticular	2	3	1	0	o.097
Polyarticular	2	8	3	0	
Systemic onset	0	10	11	5	

In oligoartiarticular type , 3 cases had mild disability, 1 had moderate disability, 2 were free of disability.

In polyarticular type, 8 had mild disability3 had moderate disability, 2 had no disability.

In systemic type 10 had mild disability , 11 moderate disability 5 had severe disability P value was not significant

	HAQ – 2				P value
	Inactive	Mild	Moderate	Severe	
Oligoarticular	2	3	1	0	o.077
Polyarticular	6	6	1	0	
Systemic onset	2	12	12	0	

After 1 yr in oligoarticular type, there was no change in disabilty status

In polyarticular type,only 1 case had moderate disability. 6 had mild disability remaining 6 had no disability.

In systemic type, none had severe disability as before. 12 had mild and moderate disability each, 2 were free of disability.

There is no statistical significance

	DAS28 - 1			**P value**
	Mild	Moderate	severe	
Oligoarticular	8	0	0	0.064
Polyarticular	10	6	0	
Systemic onset	14	13	3	

All cases of oligoarticular type had mild disease activity.

In polyarticular type ,10 had mild disease activity, 6 had moderate disease activity.

In systemic type, 14 had mild disease activity, 13 moderate and 3 had severe disease activity.

There was no statistical significance

	DAS28 – 2			**P value**
	Mild	Moderate	severe	
Oligoarticular	8	0	0	0.082

Polyarticular	15	1	0	
Systemic onset	22	8	0	

After 1 yr , there was no change in disability status in oligoarticular group

In polyarticular type, only 1 case had moderate disease activity and remaining 15 had mild disease activity.

In systemic type, none had severe disability as before, 8 had moderate and 22 cases had mild disease activity.

There was no statistical significance.

	HAQ – 1				**P value**
	Inactive	Mild	Moderate	Severe	
Age <8yrs	2	9	7	3	0.91
>8yrs	2	12	8	2	

Among children < 8yrs, 2 had no disability, 9 had mild, 7 moderate qnd 3 had severe disability.

Those > 8yrs, 2 had no disability, 12 mild, 8 moderate and 2 severe disability.

There is no statistical significance.

	HAQ – 2				P value
	Inactive	Mild	Moderate	Severe	
Age <8yrs	4	7	10	0	0.07
>8yrs	6	14	4	0	

After 1 yr, children < 8yrs, 4 had no disability, 7 had mild disability, 10 moderate disability. Those > 8yrs ,6 were free of disability, 14 mild, 4 moderate. None had severe disability. There was no statistical significance.

	HAQ – 1				P value
	Inactive	Mild	Moderate	Severe	
Male	2	14	4	3	0.12
female	2	7	11	2	

Among males, 2 had no disability, 14 had mild disability, 4 moderate, 3 severe disability. Among females, 2 had no disability, 7 mild, 11 moderate, 2 with severe disability. There was no statistical significance.

	HAQ – 2				P value
	Inactive	Mild	Moderate	Severe	
Male	4	11	8	0	0.70
female	8	10	6	0	

After 1 yr, among males 4had no disability, 11 mild, 8 moderate disability.

Among females, 8 had no disability, 10 mild, 6 with moderate disability. None had severe disability. There was no statistical significance.

	HAQ – 1				P value
	Inactive	Mild	Moderate	Severe	
Disease onset 5yrs	2	9	8	2	0.91
>5yrs	2	12	7	3	

Among those with early onset , 2 had no disability,9 mild, 8 moderate, 2 with severe disability. In late onset , 2 had no disability, 12 mild, 7 moderate, 3 with severe disability. There is no statistical significance.

	HAQ – 2				P value
	Inactive	Mild	Moderate	Severe	
Disease onset < 5yrs	5	9	7	O	0.89
>5yrs	5	12	7	0	

After 1 yr, none had severe disability. In those with early onset, 5 had no disability, 9 mild, 7 moderate. In those with late onset , 5 had no disability, 12 mild, 7 moderate disability . there is no statistical significance.

	DAS28 – 1			P value
	Mild	Moderate	severe	
Age < 8yrs	18	10	2	0.89
>8yrs	14	9	1	

Among those < 8yrs , 18 had mild disease activity, 10 moderate, 2 severe disease activity. In

those > 8yrs , 14 had mild disease activity, 9 moderate, 1 severe disease activity. There is no statistical significance

	DAS28 – 2			P value
	Mild	Moderate	Severe	
Age < 8yrs	24	6	0	0.46
>8yrs	21	3	0	

After 1 yr in < 8yrs , 24 had mild and 6 had moderate disease activity.

In the other group, 21 had mild and3 had moderate disease activity. None had severe disease activity. There is no statistical significance

	DAS28 - 1			P value
	Mild	Moderate	severe	
Male	16	10	2	0.85
Female	16	9	1	

Among males, 16 had mild disease activity, 10 moderate , 2 severe . among females, 16 had mild disease activity, 9 moderate, 1 severe. There is no statistical significance.

	DAS28 – 2			P value
	Mild	Moderate	severe	
Male	22	6	0	0.33
Female	23	3	0	

After 1 yr none had severe disease activity. In males, 22 had mild 6 had moderate disease

activity. Among females, 23 had mild disease activity, 3 had moderate activity. There is no statistical signficance

	DAS28 – 1			P value
	Mild	Moderate	severe	
Disease onset < 5yrs	8	12	0	0.122
> 5yrs	14	7	3	

Among those with early onset , 8 had mild activity, 12 moderate, none had severe disease activity. In the other group, 14 had mild, 7 moderate 3 severe disease activity. There is no statistical significance

	DAS28 – 2			P value
	Mild	Moderate	severe	
Disease onset < 5yrs	26	4	0	0.46
> 5yrs	19	5	0	

After 1 yr, none had severe disease activity. In those with early onset , 26 had mild activity and 4 had moderate disease activity. In the other group 19 had mild and5 had moderate activity. There is no statistical significance.

DISCUSSION

In our study, there were 54 patients in last 2 yrs. The commonest type of arthritis studied in our hospital was systemic onset followed by polyarticular. This is in contrast to previous studies done (16) (18) where oligoarticular was the commonest type.

The mean age of patients was 7.83 yrs. Most of the children were affected between 9 to 11 yrs. Though previous studies (2) state that there will be a peak period of onset , the age incidence in this study is not concurrent with that which may be because of smaller group of study.

In this study males slightly outnumber females. Males 51.95, females 48.1%. this is concurrent with two Indian studies by gurkirpal singh et al (17) and surjit singh et al (16). Male : female ratio were 6:2 in oligoarticular, 9:7 in polyarticular, 13:17 in systemic type.

Fever and joint pain were the predominant symptoms in all cases studied which is in accordance with previous studies in india (16) (19) and abroad (2) (3) . rash was typically encountered in systemic onset type which is comparable with previous studies(8). Hepatomegaly was also associated feature in systemic onset type . this is comparable with studies in india (16) pericarditis and uveitis were not associated with any of the cases studied. This is in contrast to studies in india (16) (18) and abroad (2) (8). This could be due to smaller group in our study and poor representation of cases –

only 8 cases of oligoarticular type.

Among the joint involvement, knee and wrist were predominantly involved. Wrist, metacarpophalangeal, and metatarsophalangeal joints were characteristically involved in polyarticular and systemic type which was statistically significant. This is comparable with previous studies (19) . Articular involvement was found to be symmetrical in 6% cases and asymmetrical in 21% .

ESR was significantly elevated in majority of cases 77% it correlated with those who presented with disease activity and disability leucocytosis and CRP positivity was also a feature in those cases with significant correlation . ASO was elevated in 22% cases which did not correlate. Rheumatoid factor was positivein 18.5 % cases – 9% inpolyarticular, 9% in systemic type. These figures are similar with previous studies (2) (19) . rheumatoid factor positivity is said to be associated with occurrence of rheumatoid nodules. However in our study none of them had rheumatoid nodules. Juvenile idiopathic arthritis being a chronic disease , anemia was present in 46% cases . NSAIDS was given in all cases as they all presented with joint pain initially. Steroids were started in 34 cases at start of study in view of disease activity. Methotrexate was given in 46 cases – 12 patient received subcutaneous methotrexate in view of disease activity and moderate to severe disability . at start of study, majority of children were having mild to moderate disability and disease activity- 5 cases 9% had severe disability. This worse disability was common in polyarticular and systemic onset type which is comparable

with earlier studies done by amita agarwal (20) where polyarticular had worst outcome. In contrast after 1 yr follow up in our study , none of them had severe disability and 12 cases of systemic type had moderate disability. 5 cases who had severe disability initially were started on subcutaneous methotrexate and prednisolone . at the end of 1 yr 2 children had moderate disease activity and 3 cases had mild activity . so methotrexate and steroids are found to be effective in controlling disease activity. 2 out 3 children with polyarticular type who had moderate disability, improved after starting steroids and had mild disabilityafter 1 yr. out of 11 cases with systemic type who had moderate disability , after starting steroids 2 were free of disability and 3 had mild disability. The mean HAQ score at start of study was 0.78 in oligoarticular, 1.03 in polyarticular, 1.46 in systemic onset. After 1 yr follow up, the mean scores were 0.75 in oligoarticulr,0 .98 in polyarticular, 1.20 in systemic type. At start of study, children subjected to DAS28 scoring, 3 cases with systemic type had severe disease activity who also had severe disability in HAQ , after starting steroids 2 cases were found to have moderate disease activity and 1 had mild disease activity . according to previous studies (21), strongest predictor for persistent disability was HAQ > 0.75 at anitial presentation. Our mean score at start of study was 1.03 and follow up score was 0.89. this is in contrast to previous study so further follow up will be necessary for future outcome regarding disability status children < 8 yrs , 3 had severe disability in those > 8 yrs 2 had severe disability.

This is concurrent with previous study (22). Both male female had moderate to

severe disability initially which is in contrast to previous studies (22)

SUMMARY

Although juvenile rheumatoid arthritis is not a rare disease, its true frequency is not known in our country. In west, its incidence is found to be 6-8 cases /100000.

JIA on childhood is a variable in terms of both presentation and outcome. Comparison across studies has been difficult for many reasons, including variability in classification of childhood arthritis, differences in study design and changes in treatment over time .commonest type in our study was systemic onset in contrast to studies in india and abroad. Most common affected age group is 9-11 yrs. Males outnumber females which is concurrent with other studies. Fever and joint pain are predominant symptoms which is comparable with previous studies.

Uveitis is not seen an any of oligoarticular type which is in contrast to other studies which can be attributed to smaller study group. Knee and wrist are most commonly involved which is comparable with previous studies. ESR, CRP and leucocytosis have significant correlation with disease activity. Rheumatoid factor is seen in 18.5 % cases in accordance with studies in india and abroad. NSAIDS are the mainstay of treatment. Methotrexate and steroids are effective drugs in controlling disease process and activity. Majority of cases have moderate to severe disability in polyarticular and systemic onset type which is concurrent with previous studies with mean HAQ and DAS28 scores of 1.03 and 2.85 respectively.on starting steroids disease activity is controlled and disability improves.children with early age onset have severe disability. Both sexes have moderate to severe disability.

CONCLUSION

Juvenile idiopathic arthritis is the commonest rheumatological disorder of childhood. Although the exact incidence and prevalence figures are not available from our country , the condition has been reported from a number of centres in india. From these studies it is seen that the disease is somewhat different from that of west. Comparison with other studies is difficult so we need more samples and longer follow up. Disability status improves on treatment with steroids.

NSAIDS are the mainstay of treatment. Second line agents are the disease Modifying anti rheumatic drugs which are used when NSAIDS are not effective in controlling the disease. Methotrexate is the most frequently used drug.

Population based studies with stringent criteria and long term follow up are the best for studying the natural history and outcome but are tedious and time consuming . even though hospital based study esp those from tertiary care centres cannot be true representatives of the outcome in a population yet they provide the first step in this regard.

BIBLIOGRAPHY

1. Modified from JT Cassidy, JT L evinson, R M Laxer, C B Lindsley, textbook of paed rheum 2005

2. JT Cassidy, R E Petty, Textbook of paed rheum 2005

3. J T Cassidy, R E Pety, Textbok of paed rheum 2001

4. Journal of rheumatology 2004;31:2

5. R E Petty, southwood TR, Baum j, Bhettav E, Revision of the proposed classification criteria for JIADurban1997 J rheumatol 1998

6. JRA criteria subcommittee of the diagnostic and the therapeutic criteria committee of the American rheumatism association, Arthritis rheumatism 1977

7. Prevalence of juvenile chronic arthritisin urban Australia

8. Nelson Textbook of paediatrics

9. Ramanan A V , WhiteworthP, Bsildam EM , use of MTX in JIA Arch Dis Child 2003

10. Cleary A G ,Murphy H D , Davidson J E , intra articular steroid injection Arch Dis Child 2003

11. Philip J Hashker, Friedland O, Uziel, New treatments for JIA IMAJ 2002

12. Ioster S , JIA associated uveitis. American uveitis society 2003

13. Prieur A M ,Chedeville G. prognostic factors in JIA.. current rheumatology reports.2001

14. Modified from Laxer R, Hashkes P J , medical treatment of JIA JAMA 2005

15. Ilowite N T , current treatment of JRA paediatrics 2002

16. Surjit Singh, Manju Salaria, Lata Kumar, Ranjana Minz*, Usha Datta and Shobha Sehgal.,Clinico-Immunological Profile of Juvenile Rheumatoid Arthritis at Chandigarh Indian Pediatrics 1999; 36:449-454

17. Gurkirpal singh , V seth Indian rheum asso 1985

18. D sircar et al Indian paediatrics 2006

19. V seth, kabra yet al, clinical immunological profile Indian j paediatr 1996

20. Amita agarwal , utcome in JIA Indian pediatrics 2004

21. Kimme, Hyrich, disease activity and disability in JIA 1 yr following presentation to paed rheumatology

22. Oen k et al J Rheumatol 2003

23. Benjamin R M review of UK data on rheumatic diseases juvenile chronic arthritis Br J Rheumatol 1990

24. Arthritis and Rheumatism 1994 gurkirpal singh et al

PROFORMA

Name
Age
Sex
Address
Height
Weight
Duration of disease

Clinical features	present	absent
• Morning stiffness • Fatiguability • Joint pain • Joint swelling • Limitation of movements • Type of joint Elbow Wrist MCP PIP Hip Knee Ankle MTP • Fever • Hepatosplenomegaly • Lymphadenopathy • Rashes		

INVESTIGATIONS

Hemoglobin ,
Total count
ESR
ASO, CRP
Rheumatoid factor

Liver function test
ECHO
Ophthalmic examination

JOINT COUNT

	LEFT		RIGHT	
	SWOLLEN	TENDER	SWOLLEN	TENDER
Shoulder Elbow Wrist MCP PIP Knee TOTAL Swollen Tender				

ENTER CLINICAL DATA TO CALCULATE THE DISEASE ACTIVITY SCORE (DAS28)

CLINICAL VARIABLE	**VALUE**	
Tender joint count		
Swollen joint count		
ESR		
Visual analogue scale		

This is a programmed software. On entering the values, scores are displayed

Interpretation

Low disease activity <3.2
Moderate 3.2 – 5.1
Severe > 5.1

Childhood health assessment questionnaire

	inactive	**mild**	**moderate**	**severe**	**Not applicable**
Dressing and grooming Is your child able to: Dress ? Apply shampoo ? Remove socks? Cut nails?	 ------- ------- ------- -------	 ------- ------- ------- -------	 ------- ------- ------- -------	 ------- ------- ------- -------	
Arising Stand up from floor? Get in and out of bed ?	 ------- -------	 ------- -------	 ------- -------	 ------- -------	
Eating Mix food ? Lift glass to mouth ? Open a box ?	 ------- ------- -------	 ------- ------- -------	 ------- ------- -------	 ------- ------- -------	
Walking Walk outdoors on flat ground ? Climb up five steps ?	 ------- -------	 ------- -------	 ------- -------	 ------- -------	
Hygiene Wash and dry entire body ? Get on and off toilet? Brush teeth ? Comb hair ?	 ------- ------- ------- -------	 ------- ------- ------- -------	 ------- ------- ------- -------	 ------- ------- ------- -------	
Reach Reach and get down a heavy object ? Bend down to pick things? Pull on a sweater over his/her head ? Turn neck to look back ?	 ------- ------- -------	 ------- ------- -------	 ------- ------- -------	 ------- ------- -------	
Grip Write with pencil ? Open door/window ? Turn faucets on and off ? Push open door by turning door knob ?	 ------- ------- ------- -------	 ------- ------- ------- -------	 ------- ------- ------- -------	 ------- ------- ------- -------	
Activities Run ? Get in and out of bus ? Ride bi/tricycle ? wash dishes/clean rooms ? run and play ?	------- ------- ------- ------- ------- 	------- ------- ------- ------- ------- 	------- ------- ------- ------- ------- 	------- ------- ------- ------- ------- 	

CHAQ score assesse functions in 8 areas – dressing, arising, eating, walking, hygiene, reach, grip, activities. Each question is scored from 0 to 3 .the question with the highest score determines the score for that area. The scores for each of the 8 functional areas are averaged to calculate the disability index.